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Book Review

Discrimination of Chiral Compounds Using NMR Spectroscopy, T. J. Wenzel. Wiley-Interscience, 2007, hardcover, 576 pp. ISBN: 978-0-471-76352-9

Determining the optical purity of a- product and assigning the absolute configuration of a compound is an integral yet unappreciated aspect of drug development. However, those familiar with the field fully realize the importance of structural determination in the successful development and application of novel therapeutics. One of the most commonly employed methods for chiral discrimination is nuclear magnetic resonance (NMR) spectroscopy. *Discrimination of Chiral Compounds Using NMR Spectroscopy* provides a detailed and exhaustive review of the broad array of compounds that have found use as reagents in chiral discrimination.

Before describing the contents of the various chapters, a brief word on the organization of the book is appropriate. One of the more common limitations that often plague references of such broad scope is that conciseness and clarity are often sacrificed to the immense amount of information they contain. Consequently, although the information being sought may exist between the covers of the text, extracting that information is frequently an arduous and frustrating endeavor. However, by organizing the chapters according to the class of the chiral reagent (e.g., carboxylic acid, amine), followed by discussions of the various compounds they may be employed to analyze, the author deftly circumvents this pitfall, readily allowing investigators to discern if a particular chiral reagent is suitable for their compound. Conversely, this organization also lends itself well in helping with the selection of a suitable reagent for a given analysis.

The introductory chapter presents a brief overview of the two different classes of chiral agents, derivatizing and solvating, and provides an outline describing the organization of the text. Chapters 2 and 3 examine the use of carboxylic acids employed as chiral discriminating reagents, with the former focusing on aryl-containing carboxylic acids, e.g., MTPA (methoxy(trifluoromethyl)phenylacetic acid) and Mosher-like reagents, and the latter providing a general review of carboxylic acids. Chiral reagents possessing either hydroxyl or thiol moieties are presented in the Chapter 4, and chapter 5 covers primary, secondary, and tertiary amines that have found application as chiral reagents. Chapter 6 catalogues the use of a varying assortment of compound classes for chiral discrimination, and includes sections on amides, lactams, aldehydes, ketones, and isocyanates, and the following chapter reviews those reagents containing phosphorus, selenium, boron, or silicon. Chapter 8 describes the application of host–guest complexation in chiral discrimination, primarily focusing on cyclodextrins and crown ethers, but also including calixarenes and calixresorcarenes. An exhaustive account of lanthanide and transition metal complexes is presented in Chapter 9. This book concludes with a look at highly ordered systems employed in chiral discrimination, covering the use of liquid crystals, micelles, ionic liquids and various polymers, and also includes a section on solid-state NMR spectroscopy.

It is somewhat misleading to refer to this text as simply a reference, as the author does much more than provide only a review of prior work in the field. By offering numerous guidelines for selecting the appropriate reagent for a given compound coupled with experimental strategies for optimizing the results, the author has turned the text into a practical guide that will aid investigators in their ongoing development of novel and more refined chiral reagents. Furthermore, the hundreds of examples drawn from the literature are accompanied with explanations detailing precisely how the chiral reagents function on each particular compound class. This leads to perhaps the most welcome and helpful aspect of this book, which can be found in the form of its hundreds of chemical structures that abound on nearly every page, and wonderfully serve to remove any ambiguity concerning the relationship between the structure and the function of the chiral reagents.

Discrimination of Chiral Compounds Using NMR Spectroscopy presents a comprehensive review of the extensive and varied collection of reagents that have found service in assigning the absolute configuration and resolving the optical purity of compounds through NMR spectroscopy. Abounding with detailed explanations and accompanying structures that provide insight into the underlying chemistry of these compounds, coupled with strategies to assist in selecting the most appropriate reagents for a given analysis, the author has succeeded in producing a practical reference that investigators who frequently employ chiral discrimination in their research will be well served to maintain close at hand.

Hugh D. C. Smyth
Martín J. Donovan
University of New Mexico
College of Pharmacy
Albuquerque, NM, USA
E-mail: hsmyth@salud.unm.edu